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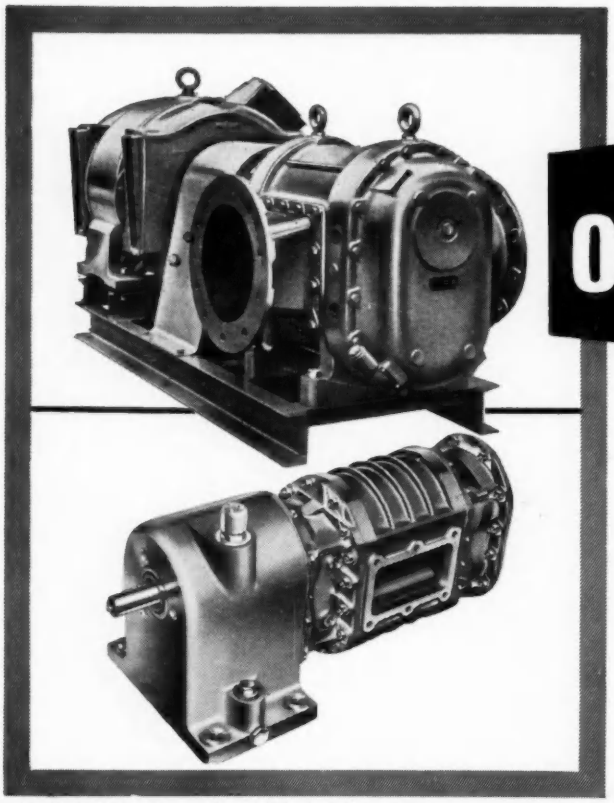

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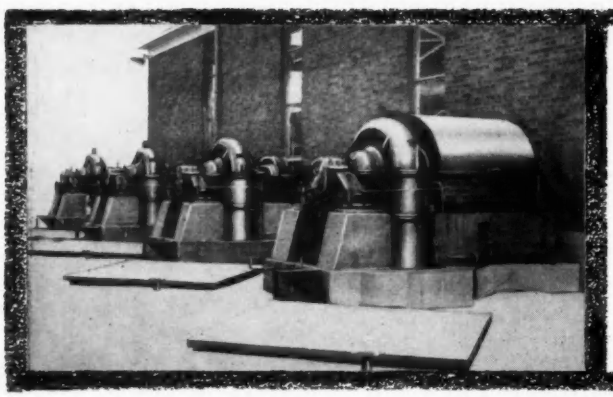

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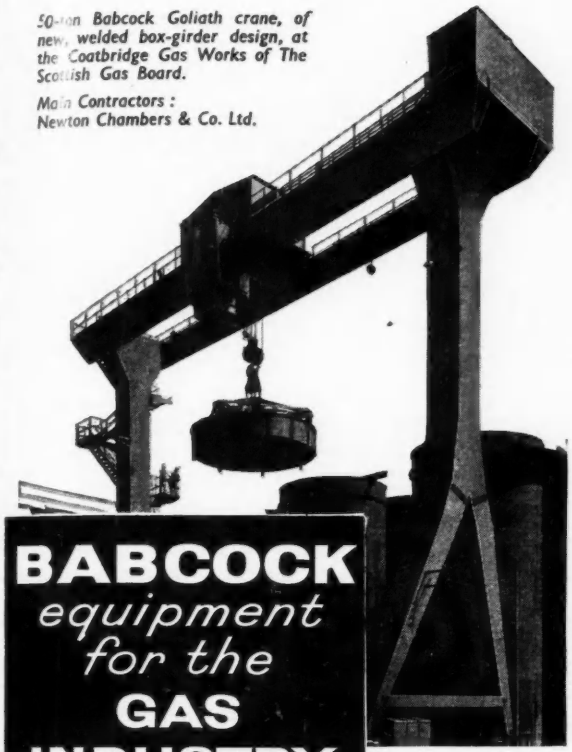

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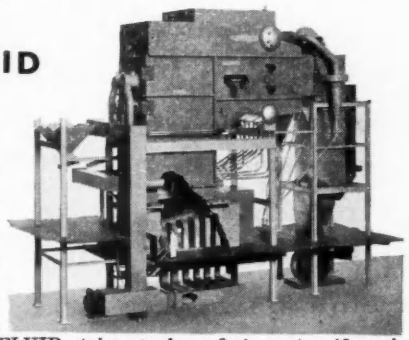

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Gas Journal

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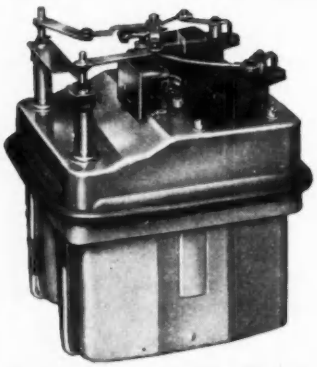

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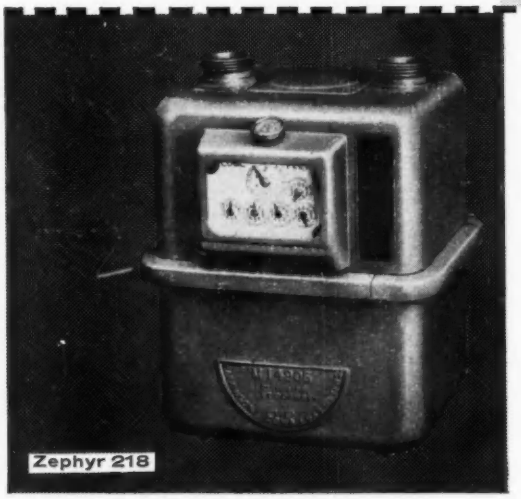

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Research must show us the way

THERE can be little doubt that one of the highlights of this year's Autumn Research Meeting of the Institution was Sir Harold Hartley's paper on the choice of subjects for research and development. Sir Harold is an old hand at evaluating the relative merits of individual research projects and at knowing, too, how best to get the fullest possible co-operation from the man or woman in the laboratory.

His wide experience of the problems facing the industries with which he has been connected over the last 40 years, his own academic work at Oxford, and his acquaintance with inventors and scientists over the last 50 years, as well as with those undertaking the development work of processes still in the experimental stage, give him a breadth of outlook acknowledged by all who know him. It is perhaps his fresh and detached, but at the same time completely practical, point of view which impressed us so much in his paper.

We did in fact get the impression of an almost Olympian, but essentially sympathetic, figure who from his long experience could give absolute opinions from an almost bottomless well of matured wisdom. It was clear from the contributions to the discussion that followed the presentation of his paper that those taking part were also conscious of this.

It is not the first time that we have attempted to evaluate the benefits to be enjoyed by industry from pure and applied research on the one hand, and the speed with which any new process can be made available to industry on the other, thus bringing to its promoters the maximum financial advantage.

Thirty years ago this time lag appears to have been about 20 years; the research worker and the practical engineer might be said to have been out of date by about half that number of years, namely, plus ten years and minus ten years respectively. But 30 years ago research—in the gas industry at any rate—was in its infancy. The first Autumn Research Meeting took place in 1929. The industry was then almost entirely dependent on the University of Leeds for any organised research projects, though the larger gas companies had begun to get fairly modest research teams together in the 1920's.

Today every industry is not only research minded and willing to spend increasingly large sums on laboratories and equipment, as well as first class personnel, but it also realises that its whole future existence depends on its being able to exploit new potentially low-cost means of production. Any research organisation must take full account of this and be provided with trained personnel to solve the problems as they arise at all stages of development.

The term 'pure' research may appear to some as an unsuitable description of the work being undertaken in our university laboratories; we would in fact prefer the term 'fundamental,' since we feel that that is the best way of describing the underlying principles investigated in the academic seclusion of our ancient universities. The discovery of the principles at the basis of hitherto unknown processes to be developed later may be looked upon by some as the highest form of scientific achievement. However, a more thorough understanding of the mechanisms of existing and perhaps well established processes is of equally great importance and may be of outstanding value to industry. This is particularly so when the quality of the product turned out suddenly and unaccountably falls off. This latter type of investigation Sir Harold calls 'first aid.'

We may take then the three main divisions of research as fundamental, development and 'first aid.' We find it extremely difficult, however, to decide which of the three is the most important, which needs the best type of intellect and which should carry the greatest distinction among its practitioners. Each needs its own type of mind and personality.

It is reasonably clear that our own industry is well equipped from its own resources to meet the demands made upon it; the research establishments of the Gas Council at Fulham and Solihull are well known for their particular technological research projects, and the area boards' own chemical departments may be doing equally important work in the 'first aid' section of research. But this may well pass unnoticed by the industry at large. For fundamental research the industry must rely largely on the University of Leeds and B.C.U.R.A.

Here then is a well balanced set-up capable of solving

all problems likely to present themselves in production, distribution, domestic utilisation and the use of gas in industry. We can now safely assume that the industry is adequately equipped to face the present challenge of the accelerated speed of development of those changing technological advances which it must consider in its fight for a competitive place among modern fuels.

The best intellects will be needed to devise and develop new means of producing the cheapest effective therm for consumers in all categories.

This has never been so important as it is today in the gas industry. With all its obvious advantages of great flexibility, ease of operation and uniformity of heating, gas must in some way or another be made available to the consumer at a lower price. Its advantages as a fuel must indeed be quite clear to the big industrial user, since the amounts sold in this sphere continue to increase, but if prices could be reduced still further it would give gas even greater advantages over oil and l.p.g. With butane available at 7½d. a therm, not only does it become a cheap enricher for gas below town gas quality, but a severe competitor in its own right.

The reluctance of the general public to buy coke and the convenience of oil for large commercial central heating system continues to point to some gas-making process which is free from a solid disposable residue, on which the price of gas may depend; for it is something of a shock today to realise that from coal carbonisation there is produced more coke than gas. The Clean Air Act was originally looked upon as one of the greatest potential promoters of coke sales of modern times, but this has not been so. The housewife would, in fact, prefer to make a clean sweep from solid fuel to fluid fuel, either gaseous or liquid, if she is not allowed to burn coal in her living room. In the long term the solution to the problem is, of course, the complete gasification of low grade coal in very large capacity plants.

The two Lurgi plants under construction and planned, illustrate this and so also does the large amount of research work on other processes from which there is no residue. Hydrogenation of coal and oil would provide a town gas without further enrichment.

The menace of l.p.g.

That the need is urgent for the gas industry not only to accept these changes but also to install the equipment, was stressed by Mr. G. le B. Diamond, Chairman of the West Midlands Board, in his contribution to the paper. He wondered whether the plants would be ready in time since he was confident that a major campaign was being mounted at this very moment to capture the industrial market for l.p.g. Should industry switch over to these gases in large quantities, the gas industry would be in a serious plight.

It was somewhat reassuring, however, that both Sir Harold and Professor Thring in a later paper, pinned their faith either to the Lurgi or slagging gasifier; it was even the general opinion among contributors to the discussion on the former paper that a few pence per therm might be knocked off the cost of Lurgi gas.

Sir Harold even suggested distributing a special grade of industrial gas below town gas standards of calorific value and organic sulphur content. This, we feel, might complicate distribution somewhat, though we would recall the distribution of low grade gas from Port Talbot to Trostre in South Wales and the South Staffordshire Mond industrial gas supplies, lately replaced by town gas.

With the development of complete gasification, or the hydrogenation of coal or oil, should be planned an extensive grid system to exploit the increased quantities of high pressure gas to the full. Pushed to its logical conclusion, such a scheme would allow electrical generation in the middle of our cities under smoke- and sulphur-free conditions; this would make possible big savings in electricity transmission costs.

Industrial gas research

What of the other papers read at this meeting? The importance of the industrial consumer ensures continuous and lively research into problems met in the design of large-scale gas burners. This year there were four papers—three read at a parallel session—of particular interest since they showed the direction in which the subjects of industrial research are turning. The first paper dealt with the use of combined town gas and oil flames for heating ferrous metals, while the other three dealt with some aspect of the utilisation of gas in tunnel burners. The efficiency of tunnel burners and the speed of heating of which they are capable, is well known, but they suffer from a severe disadvantage in being extremely noisy. This and the control of ignition under certain conditions were the subjects discussed.

Papers by gas engineers from the Continent are always to be welcomed at a meeting such as this, and the two papers, one from Belgium and the other from France, were of particular interest.

MM. J. Ribesse and C. van Maele, of Distrigas S.A. Belgium, discussed the thermodynamics of reforming hydrocarbons, while MM. Jean Dhuin and Louis Socrate, of S.N.P.A. France, spoke of the establishing of a market for natural gas. The chief interest in these two papers seems to us to lie in the different attitudes which must have inspired them. The first is a technological study of a means of gas making from oil or a derivative in order to reduce costs of production; the second is a description of an attempt to find markets for a commodity possessed in great quantity—in this case a potentially valuable fuel.

In Great Britain we have not arrived at the latter stage, but we might come to it if very large quantities of cheap gas became available. Perhaps the subject of the Belgian paper might contribute to making such a dream possible, especially if the hyrocarbon was imported natural gas.

The importance of research is clearly paramount, and each research meeting is a further reminder to the industry in general that those in charge of it at the Gas Council are fully aware of this. The choice of project for development is of supreme importance, and so also is the choice of subject for fundamental research. Both should be co-ordinated if possible, but in the very nature of things, this cannot often be done.

26th Autumn Research Meeting

The 26th Autumn Research Meeting of the Institution of Gas Engineers was held in the Assembly Hall, Church House, Westminster, London, S.W.1, last week, the President, Mr. H. S. Cheetham, being in the chair. Four new Members, 47 Associate Members and 22 Associates were elected.

OVERSEAS members, visitors and delegates who attended the meetings were:

BELGIUM:

Monsieur R. H. Touwaide (Brussels: General Secretary, International Gas Union and Association Royale des Gaziers Belges).
Monsieur J. Ribesse (Brussels: Distrigas, S.A.).
Monsieur C. Van Maele (Brussels: Distrigas, S.A.).

FRANCE:

Monsieur Y. Quéret (Paris: President, Association Technique de l'Industries du Gas en France).
Monsieur A. Lihrmann (Paris: Secretary, Association Technique de l'Industrie du Gaz en France).
Monsieur R. Liard (Paris: Gaz de France).
Monsieur J. Dhuin (Paris: Société Nationale des Petroles d'Aquitaine).
Monsieur L. Socrate (Paris: Société Nationale des Petroles d'Aquitaine).

GERMANY:

Dr.-Ing. F. A. Oetken (Frankfurt: Lurgi Gesellenschaft für Warmtechnik m.b.H.).
Dipl-Ing. W. Riedel (Butzbach/Hessen: Pintsch Bamag A.G.).
Dr.-Ing. H. Weittenhiller (Essen).
Dr. Wucherer (Hollriegelskreuth: Gesselshaft für Linde's Eismaschinen A.G.).

HOLLAND:

Mr. M. C. Tuyn (The Hague: Bataafeche Internationale Petroleum Maatschappij N.V.).

Mr. Cheetham said it was customary for Mr. Holmes Hunt to attend the meeting in order to present the medals awarded as a result of the examination in gas engineering (manufacture) and gas engineering (supply).

Unfortunately, Mr. Holmes Hunt was unable to be there owing to illness, and he had been asked to present the medals on his behalf.

The President then presented the following awards:

Charles Hunt Memorial Medals for 1960:
Michael Joseph Tidd (*London*); *Associate Membership Examination—Gas Engineering* (*Manufacture*).
Kenneth Frost (*West Kirby*); *Associate Membership Examination—Gas Engineering* (*Supply*).

James Archibald Maclay Memorial Prize for 1960:
Robert Stewart Mathers (*Maryport*)—*Gas Technology* (*Supply*).

The 21st Report of the Chairmen's Technical Committee for 1959-60, was presented by Mr. D. D. Melvin, immediate past president, and the 37th Report of the Gas Education Committee was presented by Dr. A. E. Haffner. Details of these reports will appear in a later issue.

Savoy Luncheon

THE President, in proposing the toast 'The Guests,' said that in 1963, the Institution of Gas Engineers would be 100 years old. By comparison, the Autumn Research Meeting was much younger. It was inaugurated only 31 years ago and this was only the 26th meeting which had been held, having regard to the interval during the war years.

He said: 'It is, I believe, no exaggeration to say that research in the gas industry—as, I think, in a number of other industries—is of the greatest possible importance today. We often hear it said that we are in a changing world and that the wind of change is blowing in various directions.

'In fact, the wind of change is blowing as hard or harder in the gas industry than in other industries. We are being called upon to use new feedstocks, by which I mean gas-making materials, of which we have not previously had experience.

New processes

'We are developing new processes and plants to utilise those feedstocks. We are developing various other techniques in connection with the distribution of gas and its utilisation, all with a view to meeting what, I think, is a rapidly changing pattern of demand for fuel. The requirements of our consumers are changing quite rapidly in these days.

'We review on this occasion our various research projects. Many of those projects at our various research stations have not, at this stage, reached the position when it is appropriate to issue reports. Some of these research projects, as will be understood, require a long period before it is possible to reach finality—and by "finality" I mean the stage at which a particular process may be ripe for commercial development.

'I think that Sir Henry Jones would, however, like me to assure you that although at this particular research meeting the number of papers presented which deal exclusively with research at the research stations is not particularly numerous, the fact is that research is proceeding with a sense of urgency and I hope that before long we shall be able to publish further reports which, I think, will show the value of the work which is being done.'

While referring to overseas guests, Mr. Cheetham said: 'From Germany we have a number of guests, and we have one guest in particular to whom I should like to refer. In this country, we are much interested today in the use of our own indigenous fuel in high-pressure gasification and we have turned our attention to the Lurgi process.

'In Western Germany, there is a Lurgi plant at Essen which was built under the direction, and is still under the control, of Dr. Weittenhiller.

'We in this country, who have been interested in the building of Lurgi high-pressure gasification plant, have sought opportunities of seeing that plant and having discussions with Dr. Weittenhiller.

'He has never failed us. Many of us here today have visited the Essen works. At all times, he has shown himself willing to receive us and to discuss our problems.

'I should like very much to take this opportunity of thanking him for all the kindness which we have received at his hands.'

The principal guest, Sir Alexander Fleck, was chairman of the Advisory Council on Research and Development.

'It is a matter of very much satisfaction to us that the Minister of Power has chosen Sir Alexander and his Council to advise in connection with our national fuel problems.

Notable occasion

'Sir Alexander has always shown very much interest in our gas industry and it will be remembered with much satisfaction that he delivered the Murdoch Memorial Lecture to us in 1954. I remember being present on that occasion, when he gave us a talk on "Origins and Development of Gas for Industrial Purposes." It was a most notable occasion.'

Sir Alexander expressed his pleasure to be introduced by Mr. Cheetham.

'It is now something like 20 years since he and I became associated in various activities concerning gas. Since then, of course, I have learnt to appreciate his value as a commercial man and his work among gas plants, and to realise the high value of his work and advice.

'It is a very great pleasure to be associated with him this afternoon and to be able, on behalf of all the guests, to wish you well for the 26th Research Luncheon of the Institution of Gas Engineers.

'In the literature which has come to me, I am particularly interested to see that your education activities come under the umbrella of the Research Meeting. I always think that the gas engineers did a very good piece of work when, along with the help of my late friend, Sir George Beilby, they did so much to get the British public to understand the meaning of the word "therm."

Power unit

'That was a very good piece of work that the gas engineers did to make the British public realise in some very definite measure the unit of power and the unit that they were actually consuming.

'Then, again on the educational side, the gas engineers did a great thing when gas was a very young material. I have recently obtained this information through doing a bit of research on gas work.

'When the gas people were showing the House of Commons of those days just what a wonderful thing gas was, they had some kind of apparatus in which gas was passed along a pipe and lit at the end.

'All the Members of Parliament put on gloves because they were frightened to touch the pipe in case it was full of hot gas. That was a good piece of educational work that the gas people of those days did to try to get a little idea of honest-to-God oxidation into the minds of Members of Parliament.

'The other thing that I was pleased to see was that the Institution of Gas Engineers gave their President a Technical Committee to endeavour, I assume, to keep him straight and on good technical lines during the course of his presidency.

'Speaking as an old chairman, I am all in favour of presidents and chairmen having technical committees to keep them on sound lines.

'There is one other thing which I learned with great interest. It is taken from the year 1829, not very long after gas was introduced. The *Westminster Gazette* of those days wrote that Murdoch, whom we all regard as the founder of the gas industry, had suppressed more vice than the Suppression Society had done and had been a greater police officer into the bargain.

'Men were afraid to be wicked when light was looking at them. So the gas business did a great job of work in those days in the suppression of vice.

'In passing, I can only think that if the gas industry had been recently introduced, we might have seen the Chairman being brought in to give evidence in the Lady Chatterley business.

Timely meeting

'This is a Research Meeting, and I must compliment the Institution on having a Research Meeting at this particular time. The climate for research in the gas industry is very good indeed.

'I would quote the Annual Report of the Advisory Council on Scientific Policy when talking about coal utilisation. It says: "Recent developments employing high pressures and high temperatures have made progress." But, of course, a tremendous lot requires to be done.

'Again, we have the work and views put out by the Wilson Committee, all of which, I hope you will agree, will show that the climate to go on and do progressive research work is very good at this time. I am sure that your guests join with me in hoping that the gas industry will take advantage of this good climate and go on and push forward research work in general.

'The fact that there is a good climate is my main message to you this afternoon. It is with great pleasure that, I am sure, we who are not in the gas industry see the spirit of research which obviously prevails through this meeting.

Spirit is there

'One might be frightened that with an industry where nationalised industries are so prominent—I will not use the word "dominant"—there might be a tendency for the spirit of research to be lost and to recede, but the evidence of this meeting and of this lunch shows that that is not so.

'Along with all your other guests, I wish you the very best of good luck in pursuing this spirit of research which is so necessary and which all the public evidence that we have shows is so necessary for the advancement of this industry, which plays such a big part in the whole of our national economy.'

Mr. G. le B. Diamond, C.B.E. (Chairman, West Midlands Gas Board), in proposing the toast 'The President,' said:

'It must now be 40 years ago since I first met the President, when we were both very young engineers trying to coax a recalcitrant water-gas plant through its teething troubles. I might add that it was not the only recalcitrant thing we have coaxed during all these long years.

'I have seen the President grow from strength to strength, and I am delighted that he has now become our President, because he is not only a very able engineer, but he has very kind personal qualities.'

Chairmen's Technical Committee

21st REPORT PRESENTED BY MR. D. D. MELVIN

MR. D. D. MELVIN (Chairman of the Chairmen's Technical Committee), presenting the 21st Report of the Chairmen's Technical Committee, said the technical problems presenting themselves for solution or consideration did not seem to get less with the passing of the years. Perhaps one would not wish it otherwise if they arose from forward technical development and progress and on increasing awareness of the need for safe operation and installation.

He said: 'The report reviews the work of six main committees on codes of practice, gas distribution, gasworks effluents, gasworks safety rules, meters and unaccounted-for-gas and also describes the stage reached in the negotiations being conducted by the ad hoc committee on electrical bonding.

'I do not propose to survey in detail the work of each Committee, but perhaps should draw attention to the re-establishment of the Committee on Unaccounted-for-Gas.

'Much effort has been expended in locating and repairing leakages and in the renewal and replacement of pipes, meters and plant in order to reduce the percentage of unaccounted-for-gas.

'These efforts seem, in some way, to be largely nullified or overtaken by other imperceptible factors or influences. We wish the committee well in their fresh approach to formulate a solution to this seemingly intractable problem.

'The Gasworks Effluent Committee has been collecting operational data on the various processes that have been installed in recent years for the biological purification of gasworks effluent in the absence of sewage.

'While most of the problems arising at present in connection with effluent disposal are mainly of a commercial

character, it is foreseen that if certain recommendations made in the report of the Trade Effluent Sub-Committee are implemented by legislation, the problems with which the gas industry will be faced might well mean a very full programme of work for our committee.

'I would make a strong plea for the greatest possible distribution and discussion of the documents published by these committees. This year I should especially mention the 'Recommendations for the Laying of Steel Gas Service Pipes' (Communication No. 563), the companion communication to the recently published 'Recommendations for Mainlaying' (Communication No. 491), and also the brochure entitled 'Recommendations for the Transportation, Handling and Storage of Cast Iron Pipes' (Communication No. 575).

Hopper access

'From the Gasworks Safety Rules Committee we had, last October, a third brochure entitled 'Unusual Incidents at Gasworks and their Lessons,' and in the present report we have recommendations for safe access to hoppers and bunkers, notes on the handling of catalysts and an amendment on the pumping of light petroleum distillate.

'It is essential to ensure that all previous communications and binders are kept up-to-date and that personnel at all levels and especially newly recruited personnel, are kept aware of the precautions necessary in their day-to-day work. It is only by constant training and re-iteration that the standards set can be maintained so that progress in enhancing the high standard already achieved by our industry is continued.'

Mr. F. L. Atkin introduced the Gas Distribution Committee's report, and said that the industry is laying over 240,000 new services per year and over 220,000 renewals, at a total cost of some £5,000,000 per annum—a considerable sum. Consequently it was surprising to find that the number of copies of the recommendations supplied was very small.

The Distribution Committee had been collecting statistics on broken cast iron mains, and the Committee was grateful to the area boards for their co-operation.

No criterion

'Some of you may also know that the Gas Council asked Sir Charles Ellis to carry out some operational research on the problem. The Report has now been published and confirms many of the findings of the committee —for example, that the age of a pipe in no criterion of the necessity to replace; the maintenance of a high standard of mainlaying practice, including a firm bed and solid reinstatement.'

Reference was also made in the report to the importance of main and service surveys. This was a subject the committee had under review.

Mr. T. C. Battersby (Gasworks Safety Rules Committee) said that as manufacturing units increased in size the hazards associated with fuel storage assumed more serious proportions, and regettably several operatives had lost their lives when working in bunkers. In March this year Recommendations for the Safe Access to Hoppers and Bunkers were published and were included as a supplement to the report.

'New gas-making processes bring their peculiar hazards. The deposition of vanadium compounds is a case in point. All petroleum crude oils contain vanadium compounds, the amount varying according to the origin of the oil, and on refining are concentrated in the heavy oil fractions.

'On gasification the vanadium compounds are mainly deposited with the ash found in the catalyst bed or chequer work of gasification plants. These compounds are toxic and precautions are necessary when handling used catalysts or when cleaning out vessels where ash may be deposited. The Institution Safety Recommendation M.10 (Memorandum on Precautions to be Observed in the Handling of Catalysts that have been used in the Gasification of Heavy Petroleum Fractions) was published in March and is reproduced as Supplement IV to this report.'

He thanked the area gas boards for their helpful co-operation in making available details of accidents which have occurred at their works, and stressed that no incident was too small to report to the committee. The lessons to be learned might be the means of avoiding a more serious accident or even a fatality.

Mr. Battersby said this might be the last occasion on which he would be reporting to the Autumn Research Meeting as Chairman of the Gasworks Safety Rules Committee. He thanked everyone for the support which he had enjoyed on the Committee.

The President, Mr. H. S. Cheetham, expressed thanks for all the work Mr. Battersby had done.

Real value

Mr. J. E. Davis said the work of the Codes of Practice Sub-Committee would certainly not be underestimated by those members of the commercial staff of area boards who were in daily contact with architects and housing authorities. It was the real value of this link which has led the Council to agree to an increase in the representation of such bodies on certain of the drafting panels.

Turning from the work of the Codes of Practice Sub-Committee to plastic pipes, he said that, looking ahead, when distributing engineers would be using higher distribution pressures, more unmanned holder stations, and more remote control, it was to be expected that they would demand a gas which did not, on compression, deposit liquid hydrocarbons and did not contain gum-forming constituents such as styrene.

Compliance with these requirements was very likely to ensure a gas composition with which unplasticised P.V.C. could safely be used. Meanwhile, the search for improved plastics not affected by any likely gas constituents would continue.

Mr. A. B. Horsfall (West Midlands Gas Board), said unaccounted-for-gas still seemed to remain a very controversial issue in the gas industry. From 1949-50 to 1958-59, with one or two exceptions, gross unaccounted-for losses had increased.

A statistical appraisal indicated the following assessment of losses on a very broad basis: 32½% from temperature conditions on consumers' meters; 12½% loss in consumers' premises; 55% loss from other causes including distribution systems and holders.

The committee still had considerable work to do and since some of the investigations might be long term in character, it was possible that an interim report could with advantage be made.

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26th I.G.E. AUTUMN RESEARCH MEETING

Research problems

PRESENTATION AND DISCUSSION ON 'THE CHOICE OF SUBJECTS FOR RESEARCH & DEVELOPMENT,' BY SIR HAROLD HARTLEY, G.C.V.O., F.R.S.

Sir Harold Hartley, presenting his paper, said: May I first thank you for your kind invitation to me to contribute to this Autumn Meeting of the Institution, because it is a privilege which I greatly appreciate.

My paper is in two parts. The first is mainly a personal sketch of my experience in industrial research over the past 40 years, and I dare say that it will not raise any controversial points. I have illustrated it by some of the important developments which have taken place in both the gas and coal industries in recent years, and I will add one wisecrack: Frank Jewett, President of the Bell Telephone Laboratories, once asked Professor Urey, the discoverer of heavy water, what was the difference between pure science and industrial research. 'About 20 years,' was the answer. That was 30 years ago, and I do not think it is true today, because you see how rapidly things are developing in the development of the transistor and mesa. That progress of knowledge is one of the things which one has to bear very carefully in mind, in any research programme.

The second part of the paper deals with some research problems of the gas industry, and the fortunate appearance of the Wilson Report while I was writing it gave me the opportunity to examine those of the conclusions and recommendations of the Wilson Report which relate specifically to the gas industry. You may have noticed that practically all the data in my paper are taken from the Wilson Report, which no doubt were chewed over very carefully by experts before they found their way into print.

Crucial issues

The purpose of the second part of my paper was to provoke discussion this morning on some of the important issues it raises—issues which, I suggest, are crucial for the future of both the gas and the coal industry. We have only 60 minutes, and I do not propose to occupy any more of them myself, on the assumption that some of you have done your homework. Those who have not will probably learn more from my critics when they get their teeth into my paper and tear it to pieces than they would from a hasty recapitulation of it by me.

Sir Henry Jones, Chairman of the Gas Council: The subject of the paper 'The Choice of Subjects for Research and Development' is of prime importance to any major industry, but more especially to an old industry such as the gas industry which has seen such changes in the past and must look forward to constant change in the future if it is to prosper. Sir Harold's classification of research and development projects under three heads is interesting.

As he recognises, one ever-present problem is to find the best distribution of the available effort over short-term and long-term objectives. It may be easy to find a desirable objective, perhaps the improvement of some existing process, of which it can be said that it is worth applying a given effort, expressed in terms of staff or money, for a given time, and to say also that it is not worth while going on if the results are not obtained within the time allotted.

New processes

When trying to discover new processes, or new knowledge upon which new processes can be based, the problem is much more difficult, especially as one knows that it may be years before anyone can say with certainty that the decision to begin or to continue any particular line of research was wise or unwise.

As the author indicates in section VII, much effort has been directed to the development of new methods of gas production. Incidentally his statement of the change in gas consumption between 1955 and 1959 makes the relative position of gas look a little worse than it is. The fall in consumption has been 2% in four years, not 1% per annum. Since April 1, 1960, output has been more than 4% above the 1959 quantity.

The research programme includes items expected to give a quick result, such as a pressure process for the production of peak load gas from oil, and others longer term such as a gas making process based on the hydrogenation of coal in a fluidised bed under pressure.

The Gas Council has also spent substantial sums on a search for natural gas in this country and on developing a process, culminating in the successful Methane Pioneer, for carrying liquid methane by sea, this development being a joint project with Constock, the Council's American partners in this work.

In a reference to section VII of the work of Dr. Dent the author mentions first the gasification of oil reported in 1956 and then Dent's work on coal.

Dent's work on the gasification of coal with oxygen under pressure began in 1935 in Leeds, and continuing at Poole and now at Solihull, has been reported at frequent

intervals ever since, most recently in his Coal Science Lecture 1960.

Dr. D. T. A. Townend, Director-General, B.C.U.R.A.: I am sure that we have all read Sir Harold Hartley's paper with very great interest. The first three sections provide a brilliant exposition of the psychology of the research worker, and, indeed, the philosophy of science and the application of scientific work to practical affairs.

The mental processes of the scientist seem to have much in common with those of the lawyer; in economics, the laws of diminishing utility have much in common with counterpart kinetic laws governing gaseous reactions; there is little basic difference mentally between quantitative chemical analysis and accountancy; and mathematics is a form of language employing shorthand symbols, and so on.

If versatility—I regard versatility as the hall-mark of genius—were the aim of education, the present artificial professional demarcations should tend to disappear. In education, as in all things, the price of progress is eternal vigilance, and this holds particularly in countries like ours, depending on technical and commercial enterprise.

Science seems to me to have become over-glamourised—particularly since the advent of nuclear energy—for much of it is blood, sweat and tears. The commercial man cannot buy invention by employing scientists; he has to learn to create an atmosphere of calm and trust in which advances and inventions can best ensue. This is best achieved—pending better versatility in education—by the closest contact between all professional people—particularly those working together in one industry.

I particularly like Sir Harold's statement where he says that the greatest achievements in research are effected by a group of people working together remote from immediate projects—standing on one side, as it were, with time to think.

Refined fuels

I think that the main issue nationally is that we have got to drift over the years to the use of refined fuels. If you like, better coal and oil research is the immediate national issue that we really want. We must not allow the coal industry to unwind too far during the period when oil is competitive and cheap.

The respective availabilities of oil and coal were discussed at a National Union of Mineworkers conference in March last, and a report has been published. There could be real risks, because it is thought that the oil industry might easily reach a peak output to meet demand in 20 to 25 years' time, after which it will decline, and we have to have in mind what is going to happen then.

The main thing is to establish gas grids because of the probable likely demand for lean gas—to which Sir Harold Hartley has referred—in industry. Last week I was at the Harrogate conference of the Combustion Engineering Association. I asked whether, if they had a gas of 360 B.t.u. piped to their works at the right price, they would choose it as their fuel. I think there was a unanimous answer in the affirmative.

The Russians are getting more and more natural gas. They are going to flog it while the going is good, and they will flog it to the relegation of their coal industry. The Russians are piping natural gas into the middle of Moscow and putting their power stations there. That is something which is very encouraging and is one of the research objectives of the future. If you can bring your power stations away from the pithead and into the centre of the cities and pump the fuel to them, you have avoided the transport costs of coal or oil, avoided the cost of ash removal, and avoided the very difficult problem of boiler availability. Also, the cost of transmission of gas is cheaper than the cost of transmission of electricity. So, bring the power stations into the middle of cities and use the commercial gas.

Dr. L. Rotherham, Research and Development Board, Central Electricity Generating Board:

The three types of research activity can roughly be divided into what is called pure research, development and what is described in the paper as trouble shooting. In most people's mind there is a feeling that if you proceed from one to the other you are going downhill rather fast. I do not believe this for a moment, but it is worth noting what are the differences between these types of activity.

Pure research

I prefer to think of pure research as a deep or concentrated activity, the kind of thing which can be done by one brilliant man who normally will be very expert in one or other of the tools of science, either mathematics or the experiment and the process of thinking about the result. There is more than one type of development, but ordinarily you pass through the stage of assembling the data from the deep activity and often you pass through pilot plants and large and expensive installations. Any development for use on a large scale is such that numerical appraisal of the cost is never far from people's minds in deciding exactly the cost of operation. Most of the work should be done on a small scale, even when dealing with development, but the technique of carrying it out even on a small scale is usually that a number of people are working together on similar problems.

Trouble-shooting is the third type of activity, and the best people for trouble-shooting are those with experience as well as the tools of science, which are experiment and mathematics. This is a very high form of activity, and the most versatile type of all, and if versatility is a sign of genius, then probably these are the closest to genius of those in any research activity.

However, I agree fully with Sir Harold that, in spite of this slight difference in emphasis, the main element in deciding what is a suitable subject for research is the judgment of the senior staff who are responsible for carrying it out.

I am not being unduly critical of the Wilson Committee when I say this, but I do not believe in the use of a committee to determine what is a suitable subject for research.

The Wilson Committee arrived at some very sensible conclusions, and it did so on the advice provided by a number of people who appeared before it. They provided

information and advice in which they believed very passionately, and all that the Wilson Committee has done is to reinforce the passionate beliefs of the people who provided the evidence. For that reason it has provided a good report. If they had discouraged the people who were responsible for carrying out research and had differed materially from the views advanced in that way, it might have been a bad report. I do not believe that a committee, no matter how eminent, is a substitute for a good head of establishment, who believes in what he is doing and intends to do it.

Mr. Campbell Secord, Constructors John Brown, Ltd.: I have been convinced since about 1950 that modern processes for coal gasification could play a key part in this country's future fuel supplies, and that there was room for much more technical work to improve their efficiency. In order to justify pilot development of pressurised slagging gas producers, the Ministry nominated a foster-parent in the guise of oil synthesis—which I thought was fair enough in the pre-Suez days. The twin children have grown, slowly, but they show promise; and recently they have been legitimised by the Wilson Committee. Meanwhile, the foster-parent has been drowned in a flood of oil. But no doubt new parents will be found to adopt the slagging orphans.

Coal gasification is one of the central issues of fuel policy—how to influence the investment and price policies of the four giant fuel industries, so that gas can be made from coal on a much larger scale and at a price competitive with oil for the chief heating loads, in order to meet consumers' insistent and proper preference for fluid fuels, and at the same time preserve a stable outlet for our indigenous coal.

Lurgi scheme

This objective does not depend at all upon further technical advances. A 1 mill.-ton Lurgi scheme in a 50/50 combination with light hydrocarbons can, I believe, supply town gas to London for 8d. per therm, and this is quite as cheap as any straight hydrocarbon scheme based on reforming and better than oil gasification or carbonisation methods.

The 8d. that I quote is lower than the cost given by the Wilson Committee for three reasons. First, the Lurgi figures can be improved by recent developments, including hot shift, and I believe that the efficiency achievable is more like 62% gas/coal yield overall rather than the 52% implied by the Wilson Committee figures. Secondly, l.p.g. or, I trust, methane is available at 6d. per therm, not at 7½d. Thirdly, there are, I believe, combinations of lean coal gas and enriched hydrocarbon gas in the proportion of 50/50, rather than the 37/63 quoted in the Report, and it must be controlled in regard to both enrichment therms and very considerable additional therms for the purpose of winter heat.

It is only by the early adoption of several further big Lurgi projects that the future of coal gasification can be firmly established, alongside the widespread current shift to hydrocarbon feed-stocks. This requires a truly national initiative, which will take time to mount. But I believe that now is the time to initiate at least a third Lurgi project on a larger scale than those already in train, large enough to achieve a thoroughly competitive price, and so to support a highly promotional tariff designed to increase demand in step with supply; and large enough also to justify a start upon big pipelines from coalfields to major load centres.

In my view, the possibility of making 'impure hydrogen' from coal for a price near 6d. a therm is very important. On the one hand, it promises great scope for highly promotional and competitive sale of town gas, with an increasing edge over reformed hydrocarbons. Also it encourages serious consideration for use in new types of peak power plants, such as fuel cells, for gaseous reduction of suitable iron ores, and for chemical synthesis. Incidentally, when, and only when, lean coal gas is cheaper than rich hydrocarbon gas will there be a strong incentive to increase its calorific value to 500 B.t.u. per cu.ft. or better by going to very high pressures or to a two-stage hydrogenation process.

Mr. J. E. Davis, South Eastern Gas Board: The section headed 'First Aid'—a pleasant alternative to the more brutal 'trouble shooting'—is especially valuable in dealing with the relationship between the practical engineer and the research men. If that is understood, it should bring help to the former and entice the latter out of the castellated security of his ivory tower.

The research programme which the author surveys was in essence recognised as necessary at least a quarter of a century ago. The low cost of gas transmission compared with coal transport or electricity transmission was then recognised. Coal gasification at the pithead instead of coal carbonisation locally was even then defined as a research objective. The convenience of liquid methane as a means of conveying and storing heat energy was experimented with in 1940, but all these things seemed wild dreams, or even nightmare freaks until these last few years. Why has the climate changed?

In his conclusion the author refers to three energy industries, presumably coal, gas and electricity. But what of the fourth—oil? It is surely this newcomer which has compelled our urgent interest in new methods of coal processing and made the former dreams appear as urgent necessities. I wonder, if that fourth member were magically removed or legally hampered, would we be nearly so keen on finding a solution to these problems of using coal cleanly, conveniently and efficiently?

'Refreshing words'

Mr. G. Le B. Diamond, Chairman, West Midlands Gas Board: Naturally I was interested in Sir Harold's observations on the Lurgi plant. Also, the words of Mr. Secord were very refreshing indeed to us in the West Midlands, for in 1951 when we started on our project we were told that we had backed the wrong horse. I am glad that Sir Harold mentioned that he had made no allowance in his figures of cost for recent improvements planned in the Ruhrgas plant at Dorsten, for the latter are most encouraging. The steam cooling of the grates in substitution for

the former system of water cooling has resulted in a marked upward trend in efficiency, for formerly large quantities of uncontrolled water were being converted into steam through leakage from the water cooled grates. This added water was in addition to the steam which was normally injected. In consequence, the effluent liquor has been reduced by no less than 35% on the former water cooling system. The most interesting factor of all, however, is the introduction by Dr. Weittenhiller, of the Ruhrgas CO conversion plant, which appears to be a complete success. It makes use of the steam entrained with the gas at the outlet of the generators for shift reaction and abolishes the need for the manufacture of steam for this purpose.

I am sure that Mr. Secord is right about the possibility of producing a therm of gas from the Lurgi process even cheaper than we have estimated. We have always known that that possibility existed. What is worrying me is whether we can get the Lurgi plant going in the Midlands in time. There is a very big mass attack being mounted behind the scenes to introduce liquid gases to our larger industries—there is no doubt about this at all—and we have got to compete with it with cheaper gas for the larger industries. We can do it with the Lurgi plant, but can we get it in time?

A clue?

Dr. Townend gave us a clue. Some of you will remember the time when Lancashire was in trouble years ago—it has again been in trouble recently—through not being able to sell textiles abroad, and it was said 'If only we could get another shilling a week into a Chinaman's pocket, it would set all Lancashire going.' That is the problem today; we have to get that shilling into the Chinaman's pocket so that he can buy this liquid gas.

Mr. H. D. Greenwood, National Coal Board: The Wilson Committee gave the estimated costs of gas in a large Lurgi plant as 8.59d. per therm or 8.9d. delivered to London. It is suggested in the paper that with the latest known improvements in the process the cost could be reduced down to 7.5d. per therm ex-works. While I think the reduction of 1d. per therm may perhaps be a little on the high side in relation to the latest German techniques, there are further possible methods of reducing the costs.

The Committee considered in some detail advantages and disadvantages of slagging operations and concluded that this should lead to a significant reduction in the cost of gasifying coal. It had not, however, made allowance for the improved techniques in the non-slagging process which were subsequently developed at Dorsten.

Lean gas

Sir Harold suggests that by the slagging operation the cost of lean gas might be reduced by about 1d. a therm, which would reduce the cost of the enriched gas to about 8d. a therm. He has indicated that the improved technique at Dorsten could reduce costs by about 1d. a therm. I am not sure whether it is suggested that the whole of the further improvement which might be obtained by slagging is in addition to these improvements made at Dorsten. In considering the advantage of slagging we must not forget that the carbon monoxide content is considerably increased and that the cost of removal is therefore greater.

There is no doubt, however, that the development of the slagging technique could result in a further and indeed significant improvement in cost and might well result in the final cost of the enriched gas being under 7.5d. per therm on a large plant.

Sir Harold has briefly considered the idea put forward by the Wilson Committee of having a separate supply of lean industrial gas with the minimum of purification and has suggested that this might allow cost to be cut a further 1d. per therm. If this gas were supplied direct to industry it could presumably be enriched and transmission costs thereby reduced. May I suggest to you that in view of 'the importance of the national issues at stake in the future of coal'—to quote the paper—the possibilities of making a really cheap gas by the gasification of coal should be given the highest priority in future programmes for research and development.

Dr. J. Burns, Deputy Chairman, North Thames Gas Board: My short theme is transportation of energy. We see ourselves divided into 12 local area boards with a local distribution system and not a single 150,000-V. transporter between us—not a single trunk main; and we see the electricity industry entirely gridded from one end of the country to the other. We should not be too hard on ourselves either about not putting in grids before now, because the transportation of energy relationships have changed only in the last decade—in the post-war years—and it is only during these last few years that it has been cheaper to carry the products of gas production rather than the raw materials.

Care plea

Cheap though the transportation of our products may be, we must be very careful that we do not carry out any unnecessary transportation. I am prompted in this remark by the possibility of making gas in the Midlands and carrying it down to London at 8d. per therm in a combination of Lurgi process and liquid methane. The liquid methane contributed to the extent of 6d. per therm. That methane would come from London. One asks why one should transport that liquid methane up to the Midlands at 6d. in order to send it back to London at 8½d. That is just a superficial appreciation, however, but we have all to be very careful that our economics are fundamental, basic and right.

I take Sir Harold up on one point only—the distribution of the lean industrial gas. It is much cheaper to transport a rich gas. Why should we transport it? Obviously, a mains transmission system is cheaper. You will only distribute a lean industrial gas if the lean industrial gas is very much cheaper than the rich industrial gas.

Corrosion and the gas consumer

This is the third and final resumé of the papers presented at the Joint Symposium of the Institution of Gas Engineers and the Corrosion Group of the Society of Chemical Industry, dealing with the protection of gas plant and equipment from corrosion.

THE paper by Mr. F. C. Moody and Mr. C. H. Purkis (Gas Council Research Station, Watson House) dealt with corrosion problems as they affect the gas consumer, and covered a wide field relating to domestic and industrial gas appliances with special consideration of corrosion by combustion products, notably sulphur, and by water, both vapour and liquid.

Mr. H. H. Collins (British Cast Iron Research Association) contributed a paper on the metallurgy of cast iron in relation to corrosion problems. The paper described various types of cast iron with reference to the effect of their chemical and physical characteristics on liability to corrosion. The effect of graphite in cast iron was stressed. While the rate of corrosion of mild steel is approximately steady over a long period of time, cast iron loses iron in such a way as to leave a three-dimensional skeleton of graphite on the corroded surface which stimulates further corrosion by reason of the fact that graphite is cathodic to iron.

Cast iron and steel

These differences between cast iron and steel, and even between one variety of cast iron and another, have their practical significance in understanding the performance of the metals when used as components of a gas appliance such as a tank, boiler, water heater or space heater. Thus, where steel and iron are used together as, for example, steel bolts in a cast iron tank, or mild steel tubes passing through and in contact with a cast iron shell, corrosion may be brought about by the galvanic action between the two metals.

In many cases of corrosion of cast iron, conditions are such that no graphitic corrosion residue is left on the metal surface. In these cases, the structure of the iron may be expected to be less important than the inherent resistance of the matrix, and since it is known that iron carbide is chemically more inert than iron, it is likely that a pearlitic matrix will have a greater corrosion resistance than a ferritic matrix. This effect may explain the observation that corrosion by hot 70% sulphuric acid solutions, such as are deposited on boiler surfaces by flue gases in the well-known 'dew point corrosion' phenomenon is best resisted by irons of minimum silicon content, *i.e.*, irons whose combined carbon content is as high as possible compatible with the absence of massive carbides.

Sulphur corrosion from combustion products. Sulphur affects appliance design and maintenance in two major ways; first, corrosion resistant materials or finishes may be required when condensation is liable to occur; secondly, the accumulation of products of corrosion must neither impair the safety of the appliance, nor cause annoyance to the user. The use of corrosion resisting materials adds to the first cost of the appliance, and maintenance necessary to avoid corrosion troubles is a recurrent item of expenditure.

Recent research

The importance of recent research and its applications in attempts to distribute town gas of very low sulphur content will be appreciated when we consider the major part which oxides of sulphur and acids play in causing corrosion. Oxides of sulphur raise the dew point of the combustion products passing away from the appliance because they can combine with water vapour in the presence of air to produce sulphuric acid which has a much lower vapour pressure than water. A great deal of study has been given to this problem and there is still conflicting evidence which needs more investigation. So far as gas flues are concerned, there appears to be no evidence that significant corrosion occurs until the temperature falls below the water dew point.

Sulphuric acid, condensing in a gas appliance, becomes progressively concentrated as heating proceeds, so that corrosion of a variety of materials can be expected to occur.

There are, broadly, five ways of avoiding corrosion troubles in appliances and flues.

Condensing conditions

1. *Avoidance of condensing conditions.* The dew-point is generally lowered by increasing the flow of excess air, but this lowers thermal efficiency. The tendency under non-condensing conditions is, therefore, for corrosion to increase as efficiency increases. Most gas appliances now avoid continuous condensation, although in the past flueless condensing radiators were designed with the object of increasing thermal efficiency, but the incidental troubles ultimately led to the abandonment of these types.

Although continuous condensation is avoided in the great majority of gas appliances, it is virtually impossible to prevent momentary condensation when such appliances

are first lit, since the surfaces, especially if water-cooled, are initially below the dew-point. This initial condensation increases in significance with intermittency of use, *i.e.*, frequency of repetition of the corrosion cycle, and is particularly important with instantaneous water heaters.

2. *Acceptance of condensation.* One method of combating corrosion is to encourage condensing conditions in such a way that the sulphuric acid is well diluted, and hence rendered less corrosive to some metals, notably copper. An example is the condensing bath heater. Such a method needs careful regard to the materials of construction, since some metals are much more attacked by dilute acid than by concentrated acid.

3. *Employment of corrosion-resistant materials.* Appliance parts which are required to be corrosion resistant are often those that effect the heat transfer also, and the choice of material is limited. Some nickel-chromium steels containing 2 to 3% of molybdenum come near to meeting this requirement, and are used for burners and combustion chambers in water heaters and for flue extensions on refrigerators. Materials such as aluminous cement or low porosity glaze ware may sometimes be used for flue construction.

Acid resistance

4. *Application of corrosion-resistant finishes.* Acid-resisting vitreous enamel is used on cookers, etc., but it should be remembered that, according to British Standard 1344:1947 an enamel is considered acid-resisting if it will withstand 2% sulphuric acid for 20 minutes at room temperature, but it may not necessarily be resistant to the hot concentrated acid produced by the re-evaporation of the condensate.

Heat exchangers of some water-heaters are dipped in lead/tin alloy, and the asbestos cement flue-pipe can be coated with various paints, but the difficulty of securing adhesion of the paint which will withstand the thermal stresses due to repeated expansion and contraction is still a serious problem.

5. *Employment of indirect heating.* In those industrial processes where the problem of interaction between sulphur oxides and the material is disadvantageous, it may be possible to overcome the difficulty by indirect heating.

Convector heating

During the last few years, the efficiency of the radiant fire has been increased by the introduction of an additional convector heat exchanger in the flue gases. The flueless radiator has been replaced by the convector, heating being accomplished by relatively large volumes of warmed air passing out from the appliance, rather than by heat emission from the external surface of the appliance. In convectors, which are generally used intermittently, initial condensation occurs on the inner ducts, which require protection against corrosion, and at the convected air outlets, which are usually finished in acid-resisting vitreous enamel or chromium plate.

With balanced-flue and flued convector heaters, special care is needed in design, since the efficiency is high, the dilution of products small, and possibility of condensation greater. The heat exchanger and the terminal both require special consideration. The corrosion problem may be dealt with by using corrosion resistant metals, by applying some form of surface treatment, or by using mild steel of such a thickness that, in spite of corrosion, a reasonable life is assured. A satisfactory material for the terminal is cast aluminium, which is greatly superior to vitreous enamel.

The heat exchanger must be capable of withstanding uneven temperatures up to, say 450°C., and also condensing conditions when heating up, and when the pilot light only is on for long periods. Sheet metal is used in the construction of these heaters on account of price, the materials being aluminium, heavy gauge mild steel, either unprotected or silicone coated, aluminised, or vitreous enamelled. Of these, aluminium is insufficiently stiff, and ribs may be swaged in the larger sheets to overcome this. Care must be exercised when this is done, as moderate bends may lead to stress corrosion. Aluminium corrosion products can curl and drop as small flakes, and these must be kept away from jets to avoid flame distortion or jet blockage.

Internal construction

Unprotected steel plates of such a thickness that acid products can be allowed to attack the metal without causing any major defect has proved satisfactory, but only when the internal construction is such that, when the scale falls in sheets, it is prevented from blocking vital openings and from landing on jets. Trials with mild steel with a silicone paint finish, and mild steel aluminised by hot spray, showed the steel to be ineffective for the job, because a continuous coat was not formed, and corrosion spots resulted in the undermining of large areas of the coating.

However, a heat exchanger fabricated of mild steel plates aluminised by hot-dipping appears to be most promising. After an accelerated test, it was almost free from rust except for small areas where the condensation was at a maximum.

Water heaters

The corrosion problem that inevitably arises if sulphur combustion products are present is particularly acute with the instantaneous type of water heater in which the cycle of condensation and re-evaporation occurs every time the appliance is lit from cold. These are made from copper and incorporate finned heat exchangers in order to combine high thermal efficiency with a big safety margin on combustion, together with virtual freedom from condensation except at the moment of lighting. Mr. W. N. Smirles, in the discussion, mentioned that a recent improvement in the construction of instantaneous water heaters consists of the use of copper fins inside an aluminium casing.

Corrosion of these heat exchangers can lead to restriction of air flow, and ultimately to incomplete combustion. For this reason, an accelerated 'life' test has been devised in British Standard Specification 1250:1955.

Contradictory results

The authors' experience has shown that 'life' testing is an uncertain procedure, and leads at times to erratic, and apparently contradictory results. In spite of the precautions taken in their tests to avoid known sources of error, the situation still arose occasionally where two supposedly identical heaters, tested side by side, gave quite different results, or where performance improved steadily with continued use, while the build-up of the ratio of carbon monoxide to carbon dioxide with time was invariably erratic.

It therefore appears to be desirable to consider trends in behaviour as revealed by tests on a considerable number of heaters, rather than to base conclusions on a very detailed study of small numbers. In considering such trends a general correlation between 'life' and sulphur content of the gas is evident. The curve for cleaned heaters is similar. The relationship is hyperbolic in form, although it may appear linear over a limited range. As the sulphur content decreases from a high level, 'life' increases gradu-

ally at first, but the curve turns upwards as the sulphur level drops below 20 grains per 100 cu.ft. Indeed, if it were not for the complicating action of oxides of nitrogen at extremely low sulphur concentrations, it would presumably be reasonable to assign an infinite 'life' to a heater burning gas containing no sulphur.

Limited evidence on used heaters suggests that the 'life' of a heater, after it has failed once and been cleaned, may drop to about 65% of its 'life' when new, and to about 55% after being cleaned three times.

Experience on the district, in a survey of over 700 non-condensing water heaters in the North Thames Gas Board's area which was equally divided between two areas, are receiving gas containing 25 grains of sulphur per 100 cu.ft. and the other containing half this concentration, showed a striking difference in the conditions of the heaters in the two districts, as a result of which it was decided to double the time interval between routine maintenance visits over a large area served by gas containing less than 15 grains per 100 cu.ft. The validity of this decision has been fully confirmed by subsequent experience.

Supply waters

Corrosion due to water. Supply waters corrode many metals, and some of the methods of storage and supply increase its corrosiveness. A major function of the gas industry is the heating of water, and the type of water will have a considerable bearing on the corrosion of the heating appliance. Most supply waters are sufficiently 'hard' to form a continuous and impervious layer of scale when heated, which consists mainly of calcium carbonate and is a powerful inhibitor of corrosion. Soft waters are more corrosive than hard waters towards iron boilers and galvanised tanks in that they afford no such protection by scale.

Metals liable to corrosion by water are iron, in back boilers, galvanised iron in hot water systems, copper and tinned copper, and aluminium in wash boiler pans, water heaters, and cooking utensils.

Red water

The use of back boilers with soft water often leads to rusting of the iron, and the trouble of 'red water.' It can be prevented by Bower barffing, a process which imparts a corrosion resistant film of magnetic oxide of iron to the surface of the iron. The general method of overcoming soft water attack is to use copper boilers. In such cases, trouble may be experienced at the fire face if solid fuel is used, due to reaction with the fuel and its combustion products. The advantages of copper for the water face and iron for the fire face have been combined in the production of copper-clad steel boilers, having a copper interior bonded to an iron exterior.

The use of galvanised iron tanks for the storage of hot water is common, owing to their relative cheapness. In many cases they are very satisfactory, but rapid failure sometimes occurs which is nearly always associated with operating conditions or peculiarities of the water supply. In soft water areas or where the water contains a high content of free carbon dioxide, galvanised tanks are often unsuitable, and copper installations are to be recommended.

Zinc behaviour

The peculiar electrochemical behaviour of zinc is often responsible for the corrosion of galvanised tanks containing very hot water. Although zinc at moderate or low water temperatures is electro-negative to iron, so that, when in contact, the zinc corrodes and protects the iron, when temperatures exceed about 60°C. the zinc becomes cathodic to iron in most supply waters, and ceases to afford electrochemical protection and initiates pitting at any anodic points. With gas-fired installations, high temperatures can be caused by flow and return pipes being too small, thereby restricting the flow rate and increasing the temperature rise. With the thermostat in the return pipe, excessive temperatures are reached before the thermostat can close down the gas supply.

The action of copper, either as metal in the system, or as traces in solution in the water was discussed. It is not generally recommended that galvanised hot water storage tanks be connected to the boilers by copper pipes, but, in many cases, these systems prove to be satisfactory, usually because of the good scaling properties of the water. Nevertheless, many authorities have stressed the dangers, and references are given to examples of these.

Tinned copper

Copper used for water vessels is usually tinned for the sake of appearance and as an aid to soldering of joints. Some waters, notably those containing relatively high concentrations of free carbon dioxide, oxygen and calcium, particularly when at high temperatures, will produce a surface film on the tin which acts cathodically to the underlying metal, but trouble from this cause is not very frequent.

Aluminium offers certain advantages as an alternative metal for tinned copper for wash boilers, being cheaper and often having a better appearance. It is, however, very susceptible to discoloration by water under certain conditions, and may be liable to pitting attack, especially from alkaline constituents in materials used for washing cloth fabrics.

Careful control

Anodising has been successful in overcoming these drawbacks, but, as in all sealing precautions against corrosion, the process must be carefully controlled, otherwise failure readily occurs.

Summing up the paper, it was evident that, in general, corrosion problems do not very seriously affect the average gas consumer. Such problems as do arise are due to two main causes—corrosion by sulphur oxides in products of combustion, and corrosion by water; problems of the latter being, of course, common to all methods of water heating, whether by gas, oil, solid fuels or electricity.

The obvious solution to the sulphur corrosion problem is the removal of sulphur from the gas and this is now seriously being taken in hand by the gas industry. The rate of progress in this direction is satisfactory, and is now determined by economic and practical rather than technical considerations.

Britain's coal stocks

DISTRIBUTED stocks of coal in Britain taken as on November 5, were 15.0 mill. tons, compared with 16.5 mill. tons on the corresponding date last year, says a written Parliamentary answer.

Mr. J. C. George, Parliamentary Secretary to the Minister of Power, said the reductions were mainly at power stations, gas works and house coal merchants.

Summer stocking at power stations and gas works was adversely affected by the seamen's strike, but the stocks should be adequate to meet winter demand.

NEWS SUPPLEMENT

SMOKELESS FUEL SPEED-UP?

A speed-up attempt in the production of smokeless fuel was referred to by the chairman-designate of the National Coal Board, Mr. Alfred Robens, in an interview with a correspondent of the Financial Times.

Mr. Robens, who said that N.C.B. policy must be directed towards stability in prices, spoke about a possibility that fuel prices might be reduced 'in the long future.'

He had been asked if there was any hope of prices coming down. He replied: 'In the long future with the great amount of re-deployment now taking place in the industry, with the new pits, and remembering that 80 per cent. of the coal produced in this country in a few years' time will be coming from new and reconstructed pits there is in my view a possibility of fuel prices being reduced.'

On the question of expansion he said there were many fields open to the industry, including the supply of coke to the carbide industry and the supply of smokeless fuel.

He was trying to speed up the production of smokeless fuel in view of the many smokeless zones now being planned or being brought into operation.

THAT FUEL POLICY

THE Parliamentary Secretary to the Minister of Power, Mr. J. C. George, told a Commons questioner that the Minister is in constant consultation with heads of the fuel and power industries on their future policy and on all major issues of national fuel policy, and he did not consider that any additional guidance was necessary.

He had been asked when the Minister proposed to produce a plan for fuel which would provide guidance to the National Coal Board, the Central Electricity Authority and the Gas Council.

£A200,000 ORDER

AN order for further carbonising and ancillary plant at the Osborne works of the South Australian Gas Company has been received by Woodall-Duckham (Australasia) Pty. Ltd.

The order, which is valued at approximately £A200,000, includes the extension of the existing bench by the addition of a further ten 3¾-ton intermittent vertical chambers, a second waste heat boiler, extensions to the chamber house with the provision of an electric lift, and a gas washer and gas condenser each of 3 mill. cu. ft. per day capacity.

Gas did not fail them

DEAN FOREST CONSUMERS ARE FULL OF PRAISE

WHEN the South Western Gas Board swung into action with an emergency bottled gas supply for the Forest of Dean area, after the Sharpness bridge mishap, the major emergency measure earned for them glowing praise from many quarters. About 18,000 calls were made in 20 days on the 6,000 consumers affected.

The task was undertaken as a major emergency measure. The mishap occurred on the night of October 25-26 in dense fog. At daybreak the South Western Gas Board's consumers in the Forest were visited to ensure that gas supplies were turned off. The police co-operated, radio vehicles toured the area and references were made in both sound radio and television news bulletins.

A team of more than 70 Board employees visited each domestic consumer in the Forest with a letter offering free loan, delivery and collection of a bottled gas cylinder, together with regulator and an appliance—either hotplate or small cooker.

Volunteers

These employees were volunteers and comprised many grades, including fitters, salesmen and clerks. There was also a Board shorthand-typist and several other women volunteers.

Within 72 hours of the wrecking of the bridge, the first of the bottled gas cookers were being installed.

Some 3,500 consumers indicated that they required the loan of bottled gas equipment and their needs were quickly met.

A similar scheme was put into operation by the Board's industrial engineers for large-scale supplies of bottled gas to industry, and priority arrangements were made for local hospitals and catering establishments.

The Board's three centres in the Forest—Lydney, Cinderford and Ross-on-Wye—were manned to carry out the visiting of consumers and the delivery of gas and appliances. More than 70 fitters were drafted in to cope with this work in record time and, in addition to men based in the vicinity, fitters were brought from Cirencester, Cheltenham, Swindon, Bath and Bristol.

Fine response

The Calor Gas and Bottogas organisations, and the appliance manufacturers, responded magnificently to the Board's request for urgent supplies of bottled gas and equipment to be rushed to the area. Assistance was also obtained from the Wales Gas Board.

On Wednesday morning, November 9, a temporary link by polythene tube was completed across the gap. By Sunday, November 13, virtually all the consumers affected were able to use gas again.

Great initiative and resource were shown by the engineers to overcome the many unusual difficulties involved in establishing the temporary link as the Severn is about three-quarters of a mile wide at this point.

Exhibition visitors

The Lord Provost of Edinburgh, Mr. J. Greig Dunbar with (left) the Chairman of the Scottish Gas Board, Mr. Sydney Smith, C.B.E., and Mr. T. Smith, Service and Sales Manager, Edinburgh and South-Eastern Division, at the Scottish Daily Mail Ideal Home Exhibition.

Balanced view on coal and coke needed

MR. G. W. LEE, Director of the British Coke Research Association, proposing the toast of the Association at the Annual Dinner of the Coke Oven Managers' Association, held this year at the Connaught Rooms, London, urged a proper perspective when considering the future uses of coal and coke.

Coal was primarily a source of energy and must be used as such to the full. The new methods of iron smelting could be described in the American phrase as 'fringe development' and were unlikely to affect seriously the coking industry at present.

Coke manufacture was essentially a continuous batch process and modern techniques both for the construction of the coke oven and its management had reached such a high state of perfection that every modern oven was capable of a life of 25 years during which time some 200,000 tons of coal would have passed through it.

A tribute

This was indeed a tribute to modern materials and workmanship, but he considered that in many ways the steel works were only just beginning to catch up. They had a 30-year gap in technical progress to bridge and any startling announcements were merely the narrowing of that gap.

Mr. Lee had just returned from Poland where he had been examining carbonisation practice in coke ovens there and had been struck by the lack of any form of association of coke oven managers or engineers. In fact the only occasion he had been able to meet any number of them had been at a gathering in the Polish Research Institute.

He pointed out, however, that the salaries paid to the coke oven manager there varied with the quality of the coal turned out. If x units were the basic salary, 1.4x units were payable to any responsible for production of coke of consistently good quality.

Pure research

Referring to the value of research, he pointed out that pure research not only satisfied the intellectual make up of those carrying it out, but so often and at the most unexpected moments was responsible for the most valuable advances in technology.

Replying, the President, Dr. R. A. Mott, pointed out that not only was the Association the only one of its kind, but its great asset, its year book, went all over the world.

Replying to the toast to the Guests, proposed by Mr. G. E. Hall, Senior Vice-President, Professor A. L. Roberts, Livesey Professor at the University of Leeds, referred to the work which those universities associated with applied science were doing. The coal, coke and gas industries were getting a face lift, and the universities were supplying graduates to these industries for that purpose.

So great in fact was the demand, that though he had only moved into a new building two years ago, it was crowded out. It had been calculated that the present 126,000 places in all British universities would rise to 130,000 within the present quinquennial period and to 170,000 by 1970. In his own department, the present intake of 100 every year would probably rise to 170 in ten years' time.

The type of training given to students was most important and it was a serious matter when technologists were accused of a narrowness of outlook. He was determined to broaden the basis of all training, and he expected his students to read as much outside their subject as within it.

Breadth of mind

Information was essential and every graduate must of course possess it, but a breadth of mind was just as necessary and with it generally went the ability to go to the root of a problem and solve it. His aim was to introduce the elements of culture as well as technology into the syllabus, and hoped to start the tutorial system.

Dr. A. C. Monkhouse, also spoke in support of the toast and, after recalling his student days at Leeds under Professor Cobb, spoke of the many good friends he had made in the coking industry, while performing the office of Alkali Inspector in the South Wales area. He did not think that there was any fear of the demand for metallurgical coke falling seriously. In 1957, 29.7 mill. tons of coal had been carbonised by the industry, which represented 14% of the country's coal consumption.

The President later presented the Association's Silver Gilt Medal, together with two cheques for 25 guineas each to Dr. A. O. Hall and Mr. J. Gordon for their joint paper 'The Improvement of Metallurgical Coke.' He then announced that Mr. G. W. Lee had presented a cheque of similar amount for next year's Silver Gilt Medalists.

Standard on moisture?

The amount of moisture contained in coke and other smokeless fuels may be referred to the British Standards Institution. The question was raised by the Bradford Weights and Measures Department, and the Bradford Markets Committee heard a report from Mr. W. J. Owen, the Chief Inspector of Weights and Measures. The committee wishes to see definite standards imposed controlling moisture content.

Southern plans Gloco sales boost

PLANS for expanding sales of Gloco and Gloco Nuts, to take advantage of the market for an economical, solid smokeless fuel, were outlined by the Deputy Chairman of the Southern Gas Board, Mr. A. F. Hetherington, when he welcomed 100 leading coke merchants from all parts of the Board's area to a Coke Distributors' Day at Bourne Valley.

Other speakers were Mr. W. H. Bourne, Chairman of the London and Southern Coke Distributors' Association, on 'Why bother to sell coke?' Mr. C. Fishlock, of the Gas Council's Coke Department, who talked about appliances and how to get the best out of them with Gloco; Mr. H. K. Wilkes, the Board's Coke and Products Officer, who gave hints on office routine; and Mr. G. E. Taylor, of the Training and Education Department of the Southern Gas Board, who talked about common appliance troubles.

Displayed around the room were examples of the many types and sizes of coke-burning appliances now available.

The occasion helped to launch the Board's winter coke campaign which has already made an encouraging start.

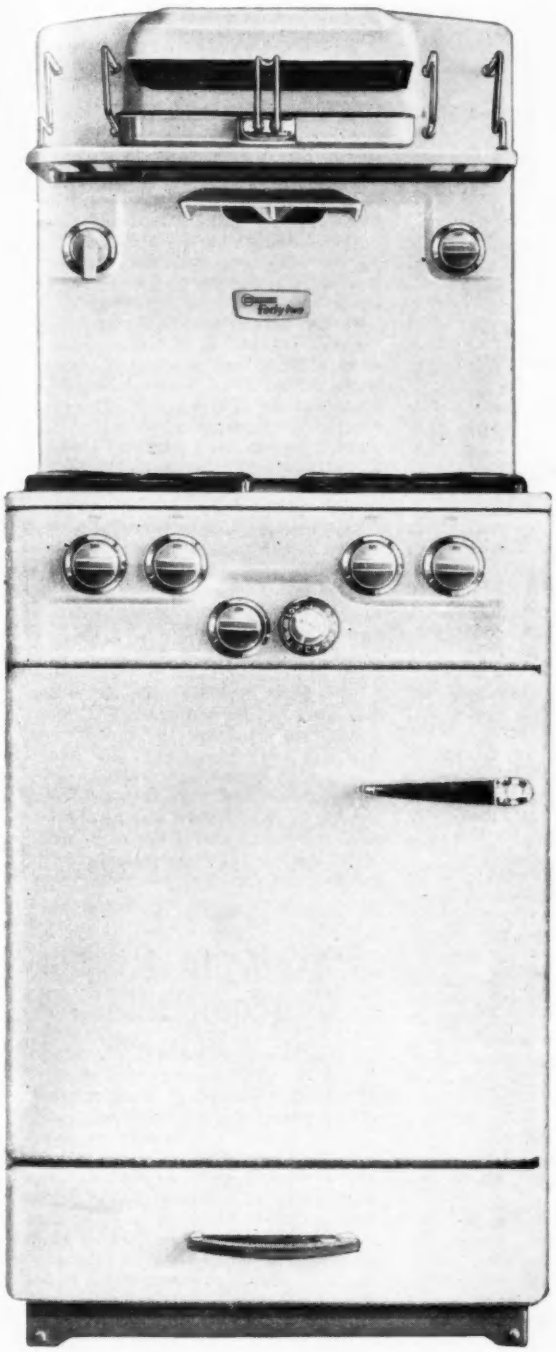
To help the drive along the Board is sending a specially equipped mobile Gloco showroom round to the five main towns in the area, also a special open display vehicle laden with sacks of Gloco.

Other publicity includes a concentrated Press advertising campaign in Bournemouth and Poole, and specially prepared Gloco leaflets for general use in showrooms. A children's painting competition is also being run.

Ignorance of science 'disquieting' says Sir Henry Jones

THE ignorance of even simple scientific concepts among non-scientific people is far more disquieting than lack of interest in other subjects by scientists and engineers, declared Sir Henry Jones, the Chairman of the Gas Council, in Leeds.

Sir Henry, the newly-elected President of the Houldsworth Society said that the gas industry had a scheme for the training of future managers; he recalled that there had been a link between the gas industry and Leeds University since the first Gas Research Fellow was appointed in 1907, and research for the gas industry had continued at Leeds ever since.



The recently announced price reduction of over £3 on the NEW WORLD 42 will stimulate and increase demand for this best selling cooker. Backed by large space advertising in the National Sunday press, the big circulation Women's Monthlies and Weeklies, and the Provincial Press, the 42 will be the year's most popular Gas Cooker.

TOP PLUS POINTS INCLUDE

* See-at-a-glance Eye-Level grill—big enough to cook 6 chops at once.
* Spacious easy-clean hotplate.
* 4 self-lighting fast boiling burners.
* Roomy, easy-clean oven.
* Large useful storage drawer.

Display and sell the New World 42

NEW WORLD

PRODUCT OF Radiation Ltd.

RADIATION GROUP SALES LTD., 255 NORTH CIRCULAR ROAD, LONDON, N.W.10. TELEPHONE: WILLESDEN 1234

New c.v. plant is opened at Bangor

NEW continuous vertical plant, installed by Drakes of Halifax Ltd., for the Bangor Corporation Gas Department, Northern Ireland, has been opened by Lord Glentoran, Minister of Commerce for Northern Ireland.

The plant has a nominal daily output of 1 mill. cu.ft. of gas and consists of eight 6½-ton vertical retorts (two settings of four units of two).

The contract was placed on September 23, 1958. Work commenced on January 19, 1959, and was completed on August 27 this year.

The plant commenced making gas on July 5.

Gas engineers from Northern Ireland, Eire and the Isle of Man attended the official opening.

The new vertical retort installation replaces one of the three existing retort benches, having a carbonising capacity of 50 tons of coal per day, and an approximate rated output of 1,100,000 cu.ft. of gas per day at a calorific value of 400 B.t.u gross per cu.ft. The installation is complete with coal handling plant.

Middle bench

It was decided that the middle existing bench would be demolished to foundation level to receive the new plant, and special arrangements made temporarily to bridge the space between Benches No. 1 and No. 3 to support and carry the existing gravity bucket conveyor which had to be kept in operation during the reconstruction period.

A temporary platform connecting the Benches No. 1 and 3 at stack platform level also to be arranged for access from one to the other for the operating personnel.

The demolition of existing bench structures to ground level and retort house steelwork down to stack platform level called for very special care in propping of the retort house structures, during this period of the removal of No. 2 Bench.

Fouled stanchions

It was also necessary to design and erect the new bench and house structure to accommodate the new coal plant and put this portion into operation as soon as possible for feeding Benches No. 1 and No. 3, owing to the mono rail and skip feeding the existing gravity bucket conveyor fouling the new bench stanchions.

This was successfully carried out and put into service in January, 1959, six months before the carbonising plant was due to operate.

Coal plant consists of a main coal receiving hopper of 25 tons capacity, with facilities at coal store ground floor level for reclaiming coal ex-stock.

The coal then passes through a jigger feeder into a 20 tons per hour chain and bucket elevator, totally enclosed.

For weighing the coal as delivered at elevator head an automatic coal weigher of Avery's manufacture is incorporated, from the outlet of which coal can be passed to all three benches.

The new retort bench consists of two settings of four retorts arranged in units of two, and are of Drake's Standard design, Model 70.

The producers are of the pressure type fitted with venturi steam nozzle equipment and instruments, and with extra capacity to produce sufficient producer gas for diluting the coal gas stream to 400 B.t.u per cu.ft. after having first steamed down to 450 B.t.u on the retorts.

The steam supply to retorts is provided at a pressure of 10-12 lb. p.s.i. from various exhausts on the works.

The main flue gases from bench pass either to a re-sited existing waste heat boiler, or to the new chimney.

The coke extractors are driven by electric motor with reduction gear units combined, and in duplicate.

The coke discharges into a motorised portable skip and is taken to the coke plant outside the retort house.

The tar and liquor circulation is by the usual Drake's method with duplicate liquor pumps. Top and bottom cast iron liquor tanks and tar tower operation from the bench.

The whole of the silica materials incorporated in the new bench are of Meltham manufacture, and the firebrick portion of the work supplied by John Morton (Fireclay) Ltd., with the whole setting insulated to the fullest extent.

NEW LABORATORY FOR CAMREX

A MODERN laboratory for Camrex Paints Ltd., Sunderland, will shortly be constructed near the site of one of their recently-opened paint factories at Moor Street, Sunderland.

The new single-storey laboratory will occupy a space of 4,000 sq.ft. and incorporates many features of special interest.

North lights will provide glare-free natural illumination, while a special fluorescent installation will enable colour matching to continue in absence of daylight.

There will be special corrosion testing rooms adapted for carrying out paint trials under conditions of salt and fresh water exposure and corrosive chemical atmospheres.

ALL-GAS HOUSE DESIGN CONTEST

TO encourage architects to study the application of the latest developments in the gas industry to the small house, the Scottish Gas Board recently offered a prize of £250 for the design of an all-gas house.

It has been won jointly by Mr. A. Clayton and Mr. T. E. Adams, both of York. The second prize winner was Mr. A. M. Clissold, of Norwich, who won £150, and the third prize of £75 went to Mr. A. S. Matheson, of Glasgow. The awards have been presented by Mr. Sydney Smith, Chairman of the Scottish Gas Board.

The winning design was for a detached family house, costing not more than £4,000. It is designed to stand above ground on a concrete base to give the impression of first-floor living, and has accommodation for man and wife, son and daughter and occasional guest. The house incorporates a ducted warm-air form of central heating.

Mr. Smith said that the competition had attracted 110 entrants.

Mr. Smith said that the Board intended to build one or more of the houses designed by prize-winners.

Professor Frank Fielden, of Glasgow School of Architecture, the assessor for the competition, said there was a quality about the winning design which placed it far ahead of any other submission.

Parkinson Cowan acquisition

PARKINSON COWAN LTD. have purchased all the ordinary shares of Bastian & Allen Ltd., pioneers in electrical thermal storage heating. Parkinson Cowan's interest in heating equipment for industrial buildings and processes now embraces gas, oil and electrical appliances for domestic and industrial applications.

Bastian & Allen Ltd., founded in the early days of the electrical industry, make electrode steam and hot water boilers, mobile steam cleaning equipment, and cooling systems for diesel engines.

Sales have been steadily expanding over recent years and the company has a sound export business. In the first six months of this year, production has been running at a high level and substantial orders are in hand.

The Chairman of the company, Mr. F. D. Campbell Allen; the Managing Director, Mr. S. A. Williams; the Sales Director, Mr. J. C. Edwards; the Technical Director, Mr. E. R. Weech, and the Scottish Sales Director, Mr. J. Jamieson, are all remaining in executive control of the business.

FUTURE OF GAS IN SCOTLAND DISCUSSED

THE Committee on Natural Resources in Scotland, a Committee of the Scottish Council (Development and Industry) held a Symposium at the Royal Society of Edinburgh at the end of October.

Among the papers given was one by Mr. E. A. C. Chamberlain, Divisional Chief Scientist of the National Coal Board, on 'Coal and Gas from Coal Mines,' which reviewed the resources of Scottish coal against the estimated needs of industrial and domestic markets up to 1980. On the subject of natural gas from coal mines, a small but useful contribution of energy was being made available from this source, but no large-scale developments appeared likely.

Mr. D. C. Elgin, speaking on 'Natural Gas and Manufactured Gas', said that a supergrid now being constructed would collect and distribute gas from new sources including the Lurgi gasification Plant at Westfield, and refinery gas from Grangemouth. The natural gas reserves of Scotland had been investigated, and plant at conventional works had been modernised.

Gas is prominent subject in Leeds University course

DETAILS of special courses to be held by the Houldsworth School of Applied Science in association with the Department of Adult Education and Extra-Mural Studies at Leeds University have been released.

A series of four lectures will be given by Mr. J. M. Hawes, of Humphreys and Glasgow Ltd., under the title of gasification practice. Gas purification will be the subject of six lectures to be given by Mr. J. J. Priestley.

Two lectures on carbonisation within the gas industry will be given by Mr. C. H. Lewis, Research Chemist, North Thames Gas Board, and Mr. F. Bell, Chief Distribution Engineer of the Southern Gas Board, will give four lectures on the distribution of gas.

Mr. W. H. Blackburn, Principal Research Chemist to the Joint Research Committee of the Gas Council and the University of Leeds, will speak on the disposal of waste liquors produced in gasworks and coke ovens. Mr. J. K. Kilham, Senior Research Chemist to the Joint Committee, will speak on the design and applications of high-velocity jet burners.

A course of eight lectures will be given by officers of the National Fuel Efficiency Service, the subjects including coal and boiler practice, the economics of fuel and testing of plant, and gas and coke.

A section of the Gas Council's stand at the exhibition organised in connection with the National Housing and Town Planning Exhibition at Brighton.

Gas central heating display at Brighton town planning exhibition

CENTRAL heating systems, of types already in use in hundreds of local authority houses in different parts of the country, were shown on the Gas Council's stand at the National Housing and Town Planning Exhibition at Brighton.

Diagrams, photographs and actual installations showed developments in central heating. One type present was the Hi-Vee small duct warm air central heating system manufactured by Heating and Building Services, Ltd., with a Popular P.30 D.L. Boiler, manufacturers Frederick Kay, Ltd. This system consists of an air-heating water circulating radiator connected to a normal boiler.

Another system on show was the Harton Heating and Plumbing Unit, manufactured by Structural Services, Ltd. Warm air is ducted to all rooms by this unit; fitted within it are the cold water storage tank, hot water indirect cylinder, water waste preventer, soil pipe and water services. The F/S D Halcyon Unit, manufactured by Wm. Sugg and Co. Ltd., with an Ascot 727 B/F water heater, which was also shown, is a selective air heater with low level controlled outlets to two or more rooms.

Heatinaire Ltd.'s G.20 D Unit, a selective heater which provides warm air through outlet louvres to two or more rooms was also displayed.

The stand also featured a number of gas-fired boilers, fires and a drying cabinet. Experts were available to explain the advantages of gas and coke.

New chairman takes over

When the London and Southern Section of the Institution of Gas Engineers met for their tenth annual general meeting, the retiring chairman, Mr. R. F. Robinson, welcomed his successor, Mr. J. A. Hepworth and referred to what he said had been for him a very happy year.

He was presented with a memento by Mr. Hepworth on behalf of the Section.

A paper was presented by Mr. J. A. Buckley, Sales Manager, North Thames Gas Board, entitled: 'Forecast—Domestic Gas and Appliance Sales'.

Parkinson Cowan change their financial year

THE Directors of Parkinson Cowan Ltd., have decided to change their financial year to end on March 31, because it has become progressively inconvenient to end on December 31, in the middle of the busiest production season; it also made it necessary to prepare the annual statement before Budget day, so that it could be contradicted by fiscal changes.

The Directors have declared an interim dividend of 5% to be paid on November 15. The final dividend will be influenced by the state of business next Spring. Preference dividend payments will now be March 31 and September 31, to bring them into line with the new financial year.

PERSONAL NOTES

MR. C. A. LEWIS has been appointed a Director and General Manager of Sidney Flavel & Co. Ltd.'s subsidiary companies, General Stampers Ltd., and Turley & Williams Ltd., operating from the Industrial Estate, Bridgend, Glamorganshire, Wales.

Mr. Lewis is well known in the gas industry from his long association as a director of Radiant heating Ltd., and was responsible for the design of gas burners for a variety of industrial applications and various types of factory heating equipment. It is the intention of Sidney Flavel to develop and manufacture at Bridgend industrial heating equipment, with which Mr. Lewis has had considerable experience during the past 20 years.

MR. FRANK LILLEY, M.P. (Kelvingrove, Glasgow) has been appointed Parliamentary Private Secretary to MR. J. C. GEORGE, M.P., Parliamentary Secretary to the Ministry of Power.

MR. F. ROBERTS, Harpenden District Manager, has retired after 51 years at Harpenden broken only by the first world war. Mr. Roberts joined the former Harpenden District Gas Company as its first junior clerk at the age of 14, and became chief clerk in 1919 and district manager in 1937.

MR. ROBERT OWEN, service and sales manager in the Aberdeen area office of the Scottish Gas Board, has been appointed District Manager of the Dundee and Arbroath groups.

MR. SYDNEY SMITH, C.B.E., has been re-appointed Chairman of the Scottish Gas Board.

FORTHCOMING EVENTS

November 30.—I.G.E., EASTERN SECTION: 'Work Study as Applied to Oxide Handling on Tower Purifiers,' by D. W. Ault.

December 1. — I.G.E., NORTH OF ENGLAND SECTION: Distribution Centre of the Northern Gas Board, Tyneside Division, Market Street, Newcastle upon Tyne. 'Engineering Comparisons of Two Recently Reconstructed Gasworks,' by W. R. Garrett. 2.30 p.m.

December 2.—I.G.E., MANCHESTER AND DISTRICT SECTION: 'Gas Tariffs,' by S. G. Deavin.

December 3. — EAST OF SCOTLAND JUNIORS: Joint Meeting with Scottish Western Juniors. Address by Sydney Smith.

December 3. — WESTERN JUNIORS: Bristol. Visit to South Western Gas Board's Stapleton Road works, followed by paper on 'The Construction of a P.F.D. Storage Tank and the Regulations Governing the Storage of P.F.D.,' by C. E. M. Stephens.

December 3. — SCOTTISH WESTERN JUNIORS: Joint Meeting with East of Scotland Association. Address by Sydney Smith. 3 p.m.

December 6.—WALES AND MONMOUTHSHIRE JUNIORS: Rhondda. Talk by D. F. Fisher.

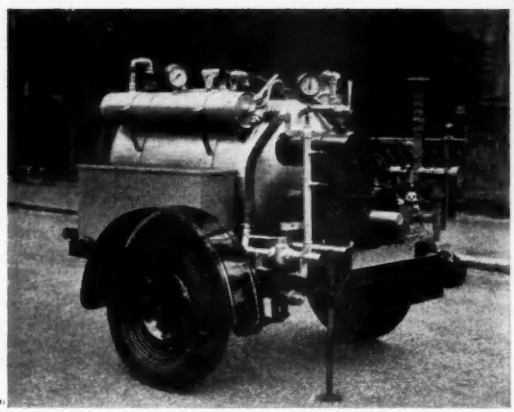
December 6.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster. 11 a.m.

December 7.—MIDLAND JUNIORS: Joint Meeting with Wolverhampton Engineering Society. Paper on 'The Lurgi High Pressure Gasification Plant at Coleshill,' by H. Moys.

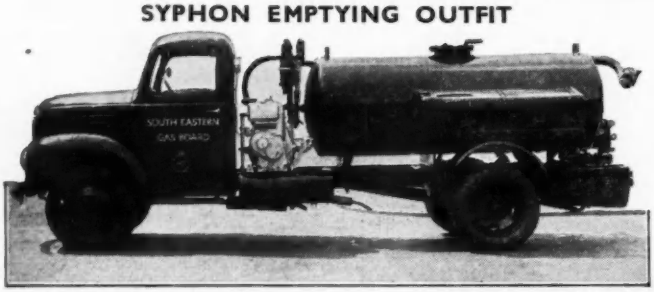
December 7.—EASTERN JUNIORS: Luton. Short Paper Competition.

ALLAN TAYLOR SERVICE PIPE CLEANING OUTFIT

The 75-gallon vacuum and pressure trailer model Service Pipe Cleaning Outfit (*right*) is now fitted with the "PRESS-VAC" Assembly and cyclone and test-bar assembly. The "PRESS-VAC" assembly enables the operator to apply vacuum or pressure alternatively to the service pipe. This operation "rocks" the obstruction and assists in clearing the stoppage. The "PRESS-VAC" tank is pressurised by the exhauster from the main tank. This permits gas to be used for this pressure operation, thus avoiding the hazard of air entering the main. The cyclone and test-bar assembly enables the operator to make pressure tests before and after cleaning the service pipe, the test taps passing 50 cu. ft. or 100 cu. ft. as required. By using the cyclone the dust drawn from the service pipe is deposited in the sight glass for inspection and then into the easily removable container below. This enables the operator to determine the extent of the cleaning and prevents the greater part of the dust from entering the main tank. The "PRESS-VAC" assembly can be fitted to all existing service cleaning outfits.



SYPHON EMPTYING OUTFIT



The Vacuum Syphon Emptying Outfit (*left*) is mounted on a 4 ton **Thames** Chassis. A 600 gallon galvanised tank is fitted. A rotary type exhauster is driven by a 4 b.h.p. four-stroke air cooled engine, mounted on a sub-frame behind the cab. The tank is fitted with a flame-proof vent and the outfit can be used for high or low pressure syphon emptying. A large manhole at the rear allows the tank to be cleaned easily. A sight glass is fitted to enable the operator to know when the Syphon is emptied. Twenty-five feet of 1½ in. suction hose is supplied with the outfit. The outfit can be used for vacuum or pressure working.

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